Station area projects in Europe and beyond: towards transit oriented development?

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Station Area projects in Europe and Beyond: Towards Transit Oriented Development?

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The redevelopment of railway stations and their surroundings has been high on the agenda of European cities for more than two decades. An evolving set of factors has fuelled these initiatives. Driving forces include the expansion and upgrading of rail infrastructure, the reduced demand for industrial space in central urban locations, the privatization of railways, efforts to increase the attractiveness of cities, the quest for sustainable development and – last but not least – the spatial dynamics of contemporary society. Across the different years and countries, these factors have been combined with shifting emphases, resulting in three different ways of framing station area projects, here labelled 'property capitalization', 'urban mega-project', and 'transit oriented development' (TOD). The last frame puts initiatives in Europe on a par with similar efforts in other parts of the world. In the second part of the paper global, emerging experiences with TOD are reviewed in order to draw lessons for current initiatives in Europe.

The redevelopment of railway stations and their surroundings has been high on the agenda of European cities for more than two decades (Bertolini and Spit, 1998; Van den Berg and Pol, 1998; other contributions to this journal issue). In some cases impressive projects have been realized and swiftly heralded as best practices for all to follow, but in many others the way to implementation has proved a daunting one. Contrasts also define the present: again, impressive projects coming to fruition, as at King's Cross in London; and again, just as impressive conflicts exploding, with the nation-wide, heated controversies around the Stuttgart 21 project in Germany as arguably the most extreme example. In several respects, the arguments of proponents and opponents of station area projects are being replicated in each new case, leaving the observers to wonder if anything has been learned in all these years. Other evidence, however, shows that both the rationale behind the projects and the approach to their implementation has been evolving, and continues to do so. Most intriguing in this respect is the possible fully-fledged embrace by European cities of what in other continents has become known as 'Transit Oriented Development' or TOD (Cervero, 2004; Dittmar and Ohland, 2004; Dunphy *et al*., 2005; Curtis *et al*., 2009). This is an approach to station area projects which reaches further than single locations, and aims at the re-centring of entire urban regions around transport by rail and away from the car. In order to explore this evolution and give a context to the other papers in this issue of *Built Environment*, this paper first, reviews the changing factors driving station area redevelopment in Europe; and second, explores emerging approaches and TOD practices worldwide. Building on lessons

from these different contexts we conclude by sketching possible implications for future station area projects.

Unravelling Station Area Projects in Europe

Driving Forces

A combination of heterogeneous, interrelated factors converges in determining the continuing importance of station-related urban projects in Europe. In several ways, these are no different from factors pointed at in earlier analysis (Bertolini, 1998). There are, however, also significant shifts occurring in the current period. Six distinct factors (grouped under four elements) can be seen at play as driving forces in station area projects. These encompass technological innovation (the first two factors), institutional innovation (the third), public policies and discourses (the fourth and fifth), and, crucially, more autonomous developments on the demand side (the sixth).

Technological Innovation: Rail Infrastructure. A first factor triggering station area projects in Europe is the new development opportunities provided by transport innovations. Most apparent is the steady expansion of a continent-wide High-Speed Railway (HSR) network together with the expansion of regional and urban rail systems. While in some cities and station areas the HSR just marginally improves accessibility, in others the accessibility boost appears to trigger new development independently of other factors. This can be seen in the case of Euralille, the station complex at the heart of the Lille metropolis, in France, which has capitalized on the dramatically shortened travel times to Paris, London and Brussels (Bertolini, 2000; Moulaert *et al.*, 2001; Newman and Thornley, 1995; contribution elsewhere in this journal issue). A similar HSR accessibility boost can also apply at the regional rather than international scale, as with developments around Ebbsfleet station in the Thames Gateway east of London, triggered by an HSR link bringing the station area within commuting range of the British capital. Even where the relative change in accessibility is not so extreme, the opening of an HSR, even just for its image, can provide a catalyst for development, as documented by projects at practically all centrally located HSR stations in Europe (Van den Berg and Pol, 1998; De Jong, 2007).

On a different scale to HSR, but often no less important is the development of new or expansion of existing urban-regional rail-based systems. The most important stations on these networks may show preferred places for urban developments, and sometimes become the focus of major development, such as with the new urban district of Neu-Oerlikon, in Zürich, anchored to one of the main stations of the regional S-bahn network. Particularly interesting variations are stations which enjoy excellent accessibility by both train and car (because they also have direct access to a motorway). In the largest cities of the Netherlands for instance, these multi-modal locations are those experiencing the most intense property development dynamics of the whole urban area. Examples include Amsterdam Zuid WTC, Amsterdam Bijlmer Arena, and Rotterdam Alexander. The attractiveness of multi-modal accessibility is also at play in developments around the stations of new rail links connecting airports and cities, as shown by extensive developments and plans along such connections in cities as Copenhagen, Stockholm, Helsinki, and Zürich.

Technological Innovation: Logistics Innovation and Industrial Land Use. A second factor of station area projects in Europe is the generalized transfer of distribution and manufacturing activities away from station areas and towards more peripheral urban locations (or even abroad, in the case of manufacturing), and new dedicated freight interchanges. Behind the shift is both a transition from an industry to a service-

based urban economy and the continued search for economies-of-scale and scope in logistics. Both trends mean that land next to stations, which was traditionally used for industrial purposes, is being freed up for new activities. Examples of recent developments made possible by such a move are the new Congress Centre at Stockholm Central Station and the new mixed urban quarter east of Amsterdam Central station, both replacing former freight activities. Developments in London's King's Cross and Zurich's Neu-Oerlikon, as well as around Holland Spoor station in The Hague, have followed the loss of former manufacturing functions there. While in a few cases (Neu-Oerlikon being an example) this might have even been the main factor behind transformation of the area, in many it seems more a necessary than a sufficient condition.

Institutional Innovation: Privatization of Railways. A third factor relates to institutional rather than technological change: the privatization, or at least the shift towards greater market-orientation of transportation, and most notably, railway companies. One consequence of privatization is that transportation infrastructure and service providers are increasingly seeking ways to recapture the accessibility advantage they help to create. Characteristically, this results in the development of commercial activities (e.g. retail, leisure) within stations and re-development of land above or around stations. At first this seemed to entail little more than capitalizing upon land premiums (by selling land around stations) and rent premiums (by renting out space inside stations). Recently, a more articulated strategy is emerging, aimed at providing a 'total package' of services to passengers and others, reminiscent in several respects of the Japanese model of the railway company as a 'lifestyle business' (Chorus, 2009). Documenting this new direction, NS (the Dutch Railways) state in their 2009 annual report that: 'Our ambition is to be

a customer-driven, European, multimodal service provider, offering reliable passenger transport, comfortable trains and buses, lively station areas and a wide range of services and facilities in the transport chain from door-to-door' (NS Groep, 2010, p. 3). Stations and their surroundings have a key role in this ambition: NS 'is aiming to use varied development and customer driven commercial operations to win the hearts of everyone who uses the station areas for travelling, living, working, learning, shopping, eating and drinking' (*Ibid.*, p. 35).

Public Policies and Discourse: Boosting the Attractiveness of Neighbourhoods and Cities. A fourth factor stimulating station area development are policies which see new, large-scale area development projects as a key means to boost the attractiveness of urban neighbourhoods – and through them, of the city as a whole, creating places to live, work and consume, a concern common to national and local governments throughout Europe (Salet and Gualini, 2006; Majoor, 2008). Many of these area development projects typically show a dense mix of office, retail, leisure, and housing and are located around highly accessible places such as main railway stations. In particular, high-speed railway (HSR) station areas in European cities have been the theatres of many such initiatives in recent years (Van den Berg and Pol, 1998; De Jong 2007). Major, characteristic examples are Euralille in Lille and King's Cross in London. In the Netherlands, each of the six new HSR stations in the country anchors one of the so-called 'New Key Projects', the most important, national government sponsored area development projects in the country. Echoing the aims and efforts in other European countries, the Dutch government states in this respect that:

The Netherlands has joined the new European high-speed railway network (HSL), which will create great opportunities for the stations on the networks routes. Their optimum accessibility should persuade many national and

multinational businesses to move close to them. With new facilities, outstanding architecture, and uncluttered open spaces, the HSL station areas could be transformed into attractive places to live and work. The government … wants to spread the stations' bustling urban atmosphere to their surroundings, creating new station areas that are again a valuable part of the city. (Ministry of Housing, Spatial Planning and the Environment, undated, p. 1)

Public Policies and Discourse: Quest for Sustainable Development Patterns. A fifth factor is also of a public policy nature and stems from mounting concern about the sustainability of 'sprawling' and 'car-dependent' urbanization patterns. The integrated development of railway networks and land around the nodes of those networks is seen as a way towards a more public transport and non-motorized modes-oriented, concentrated urbanization pattern. The arguments for this shift are not merely environmental (reduction of pollution, greenhouse emissions, land consumption, etc.); many local governments and citizens also see it as a condition for the development of a much needed mobility alternative for metropolises rapidly approaching traffic gridlock. Typically, and different from the developments described in factor four above, these strategies are less focused on single station precincts and more on developing a polycentric network of station areas of different size and function in an urban regional context (Roger, 1997; Hall and Ward, 1998). Examples are the long-standing and continuously revamped public transport and land-use development strategies of such cities as Copenhagen and Stockholm (Cervero, 1998; 2009) but also more recent initiatives such as the 'Stedenbaan' project in the Rotterdam-The Hague area in the Netherlands (Balz and Schrijnen, 2009), or the '100 station plan' and the 'regional metro' in Naples (Cascetta and Pagliara, 2008; 2009).

Demand Trends: The Spatial Dynamics of Contemporary Society. A last, but by no means least factor relates to the spatial dynamics of contemporary urban society, which is a crucial factor, because, other than the largely supply side factors discussed so far, it is firmly rooted in relatively autonomous trends on the demand side. This is, of course, a complex theme, to which extensive and acclaimed literature has been dedicated (e.g. Harvey, 1991; Castells, 1996; Ascher, 1995; Graham and Marvin, 2001; Storper and Venables, 2004; Urry, 2007). However, the essence of this spatial dynamics can be usefully summarized for the benefit of the argument in this paper. Key driving forces are the sharply falling technological and institutional barriers to the movement of people, goods and information, which intertwine with broader processes of globalization of the economy and individualization of society. The result is increasingly 'footloose' households and firms, which, however, do not just diffuse in space, but rather use space selectively, and locate in different places, depending on trade-offs that vary per actor and/or activity (for instance single-person households, and tourism and creative industries locate in old city centres, and family households, business services and large-scale retail locate in the urban periphery). At the same time, all these spatially distributed activity locations still need to be functionally connected. Extensive travel mobility is thus both a factor and an outcome of these developments: mobility allows distributing activities in space, and the need to connect distributed activities generates mobility. As a result, travel time, rather than distance increasingly determines the functional extent of cities, resulting in the emergence of travel time-bound 'urban mega-regions' (Hall, 2009; Lang and Knox, 2009). Crucial for the argument here is that in these urban mega-regions transportation interchanges are the emerging centres. This follows the notion that in a spatially distributed city, where mobility flows intersect, opportunities for human interaction are highest. These are the places where the still much valued 'face to face' exchanges of the knowledge economy and 'shoulder to shoulder' experiences of the leisure economy

can most conveniently happen (Bertolini, 2000).

In addition, recent demographic and economic trends seem to favour highly accessible locations, such as station areas (see e.g. Urry, 2007). Such trends include: the aging society (with the elderly looking for locations granting easy access to daily life sustaining services), compounded in some regions by population decline (with services being downsized and concentrated at the most accessible locations); the increase in double-earner households (seeking residential locations with flexible accessibility to different jobs and services); and the emergence of more flexible, mobile working arrangements (where 9-to-5, Monday-to-Friday office presence is being substituted by a combination of working at the office, at home and on the way, and, crucially, face-to-face meetings at accessible locations).

Many stations and their surroundings are seen to fully embrace these trends. Examples are the major new concentrations of meeting, shopping and leisure facilities following the refurbishment of central stations in for instance London, Paris, Rome, Leipzig, Cologne, Berlin, Zürich, Basel,

or Antwerp, or the opening of major new conglomerates of facilities at stations in the urban periphery, such as at Rotterdam Alexander and Amsterdam Bijlmer Arena in the Netherlands or at new HSR stations, such as in Lille. Utrecht Central Station in the Netherlands (figure 1) perhaps best epitomizes the full breadth of possibilities: it is not just a shopping mall, but also a major entertainment, congress, and exhibition complex, fully integrated with offices and residences. These are, it must be emphasized, by no means univocal or uncontested developments. There is an intrinsic tension between the notion of the station as an open in access, free in use, truly public urban space and that of the station as an enclosed and controlled 'zero friction' (Hajer, 1999) space, severed from its surroundings. Some, if not most of the examples cited above seem indeed to tend towards the latter notion. There are, however, also enough examples of deliberate choices for the former notion, as for instance testified by the breath-taking new public spaces at Madrid Atocha Station or the rich cultural programme of Kassel KulturBahnhof.

Figure 1. Utrecht Central Station, the Netherlands: station hall. (*Source*: Authors)

Shifting Approaches Over Time

In any one specific station area development, the six factors discussed above overlap and interact with each other. They are often all present at one point in time, albeit with different emphasis in different contexts. Furthermore, there are many ambivalences and contradictions, as made explicit when discussing the sixth factor, but as also evident in the other five. For example, the development of high-speed and urban-regional railways can complement each other, but also be in competition for ever scarcer public resources. The same ambivalence applies to the choice for a single, major station area project in a city or, alternatively, for a collection of smaller projects distributed across the whole urban-regional network. Additionally, there are large differences between a railway company focusing only on maximal returns on their property assets and one operating as a diverse service provider. Finally, the public policy goals of promoting the attractiveness of cities through large-scale projects and that of achieving sustainable urban mobility do not necessarily lead to the same or even compatible choices. It is precisely because of these ambivalences and contradictions that station area redevelopment projects may become the locus of prolonged confrontations, as for more than twenty years at King's Cross (Bertolini and Spit, 1998; Holgersen and Haarstad, 2009; contribution to the journal issue), or outright conflicts, as presently around the Stuttgart 21 project in Germany, seen by one side as a much needed modernization of the transport and urban system and by the other as a waste of public resources and a threat to the local environment. Other experiences, however, show that syntheses of, or at least compromises between the different interpretations of a factor are also achievable, as it is possible that developments mentioned under the six factors complement rather than contradict each other, setting powerful self-reinforcing dynamics in motion.

In light of the above it is interesting to see how the framing of station area projects in Europe has changed in the last couple of decades. For the purposes of exploratory investigation, discussion and illustration, and acknowledging the dangers of taking a schematic approach, we distinguish three frames, each reflecting a different mixture of factors: 'property capitalization', 'urban megaproject', and 'transit oriented development'. Table 1 summarizes the main features of the three frames discussed in this section. Before discussing and illustrating each of them, two notes of caution are needed. First, the three approaches are characterized by a dominating policy, or discourse focus. In part this focus is the result of a deliberate choice. In part, however, it is rather the consequence of given differences in the position of cities, areas and stations in respectively the (inter)national, urban regional and transport network hierarchy, and of differences in the institutional context. These latter aspects cannot be discussed in detail. However, their role should not be overlooked. Second, the three frames are described as following each other in time, and pinned to a particular decade. Also in this case, there is a risk of oversimplification: while a general temporal trend appears recognizable, in most national or even local contexts different approaches may co-exist at the same time, and may shift back and forth between one frame and the other. The following characterization is thus not meant to suggest a deterministic evolution towards the better, but rather aims to provide a heuristic tool to help structure the discussion around different, alternative ways of framing the station area development challenge, which might be more or less appropriate depending on the context.

Frame 1: Property Capitalization. In the 1980s a 'Property capitalization' approach seemed dominant, focused at the station building or street block level, and especially directed at cashing in on land owned by newly privatized railway companies in centrally

Table 1. Summary of characteristics of station area development frames.

Frame →	1. Property capitalization	2. Urban mega-project	3. Transit oriented development
Period of higher occurrence/discourse dominance (indicative)	1980s	1990s	2000s
Iconic example	Broadgate (London)	Euralille (Lille)	Emerging: Stedenbaan (Rotterdam-The Hague), Campania regional metro. Established: Stockholm, Copenhagen.
Geographical focus	Central station building and street block.	Surrounding areas of the main station interchange.	Multiple locations at stations across the entire urban-regional railway network.
Most typical areas and cities	Major European metropolises (London, Paris).	Cities in the midst of an economic transition to which the HSR provides an accessibility and image boost (e.g. Lille, Rotterdam, Liege).	Polycentric urban regions with an extensive railway infrastructure (as in the examples above).
Leading actors	Railway companies, property developers.	Local and national governments.	Coalitions of regional governments and public transport agencies.
Most important driving factors (with reference to pages XX)	Privatization of railways. Spatial dynamics of contemporary society.	Expansion of rail infrastructure (HSR). Boosting the attractiveness of neighbourhoods and cities. Spatial dynamics of contemporary society.	Expansion of rail infrastructure (regional). Quest for sustainable development patterns. Spatial dynamics of contemporary society.

located station areas. This approach is perhaps best typified by 'air-right' developments at stations in London, with Broadgate (at Liverpool Street Station) as the most ambitious one (figure 2). Similar trends and aims were present in other countries, for example in France, Italy and Germany or elsewhere in the UK, but the London example has been difficult to replicate. At the time, a few station area redevelopments in central Paris (such as at Gare Montparnasse or Gare de Lyon) appear the only comparable examples in Europe. Typically, elsewhere the development potential was overestimated and the complexities of development underestimated, showing a lack of understanding of the exceptional factors fuelling the London (and in part the Paris) railway station transformations. The City of London, in or near to which all these projects were, was in fact then experiencing a financial and real estate boom, with office rents several times higher than central locations elsewhere in Europe. Furthermore, the London projects, while ambitious, had a much narrower, more manageable scope than many Euro-

pean emulators: they were office only developments, not reaching further than the station building or street block, and no major restructuring of the railway infrastructure was involved (no HSR connections for instance). Even in London, the approach would soon show its limits. The developers of Broadgate tried to replicate it at King's Cross, but the different time and location (past the boom and too far from the City), together with the different degree of complexity (the aim of developing more than just offices, spanning a much wider area, and the inclusion of major infrastructure transformations, including an HSR connection) would prove its limitations. The location and time were just not attractive enough for the required private investments, and the more complex programme meant that many more and much more divergent interests had to be dealt with than just those of property owners, developers and office users (Bertolini and Spit, 1998).

Frame 2: Urban Mega-Project. In the 1990s, a different approach started to emerge, and eventually became dominant. It can perhaps be best characterized as an 'urban mega-project' approach. While the former approach was especially related to the third of the driving factors discussed above (privatization of the railways) and in lesser measure the sixth (spatial dynamics of contemporary society), the 'urban mega-project' approach can be most directly related to the first driving factor (most notably, development of the European HSR network), the fourth (public policies to promote the attractiveness of neighbourhoods and cities) and again (but more explicitly) the sixth factor (spatial dynamics). The geographical focus shifted, now embracing the areas surrounding the station interchanges (often in the order of several thousand square metres). Typically, station projects following this approach attempted to build on the accessibility boost provided by the new high-speed links in order to put cities on the international map (both real and imagined) and develop new functions at stations that could act as catalysts of a transition of the urban economy

Figure 2. Broadgate, typifying the 'property capitalization' approach. (*Source*: Broadgate)

(often from industry-based to service-based). 'Boosterist' local and national governments were the main proponents rather than the railway companies or property developers, as in the 'Property Capitalization' frame. Perhaps the most representative example of this approach is Euralille, in the city of Lille, in France (figure 3). It was also the one everyone tried to emulate in the 1990s, as for instance in the Netherlands with the 'New Key Projects' programme mentioned above. Once again, many of the emulators tended to overlook the exceptional, non-replicable features that Euralille had. These included: a city mayor who was also prime-minister and president of the region, and could thus force consistent decisions at different governmental scales (such as that of having the HSR stop in the middle of Lille); a unique boost in international accessibility due to the uniquely central position acquired by Lille in the European HSR network (in-between the 'Golden Triangle' of London, Paris and Brussels); the existence of a vast amount of newly available, undeveloped land adjacent to the station and city centre due to the expiration of century old military rights; and a strong 'sense of urgency', and thus local degree of consensus, due to the widely perceived need to reconvert a local economy

badly affected by deindustrialization. Emulators also tended to overlook the problems that Euralille was encountering. These included, insufficient infrastructure capacity to deal with the rapidly growing passenger flows, property developments not keeping up with expectations (particularly developments oriented to an international market), and more generally a lack of flexibility in the plan and design in the face of changing external conditions (Bertolini and Spit, 1998; Bertolini, 2000 – see, however, the contribution in this issue for more recent developments at Euralille).

Frame 3: Transit Oriented Development. More recently, the focus appears to be shifting again. The fifth driving factor (promoting sustainable urban mobility) appears to be more central, together with the first factor (transport innovation, but with a relative shift in emphasis towards developing urban-regional rather than HSR networks), and with the sixth factor (the spatial dynamics of contemporary society) as a continuing essential trigger and condition. The geographical focus is not so much on major, but inevitably exceptional station area projects, but rather on coherent combinations of 'ordinary' transport and urban projects, some

Figure 3. Euralille, typifying the 'urban mega-project' approach. (*Source*: Euralille)

large but many small, aimed at redirecting the development of entire regions towards public transport networks, and away from the car. While it is too soon to talk of examples to emulate, new developments aptly typify-ing this approach are 'Stedenbaan' in the Rotterdam-The Hague area in the Netherlands (Balz and Schrijnen, 2009, figure 4*a*) and the '100 station plan' and 'regional metro' in Naples (Cascetta and Pagliara, 2008; 2009, figure 4*b*). It is a shift in focus that echoes developments in Europe in the past (as in Stockholm or Copenhagen) and in other parts of the world presently, and what has internationally come to be known as 'Transit Oriented Development' (TOD).

TOD is a global rather than just European endeavour. Accordingly, in the remainder of the paper we draw on insights emerging from worldwide experiences in order to further sketch the contours of this emerging frame, which goes beyond the space of the station precinct to focus on urban and transport development citywide. A second aim of the next sections is to try and go beyond the 'emulate the best practice' approach to station area projects in the past, which (as argued above) has often seemed an obstacle rather than an incentive, to learn what could be done in a context quite different from that of its example. In particular, comparisons with experiences in other continents will help to understand the peculiarity of the European context.

Figure 4. Stedenbaan (*above*) and The '100 station plan' in Naples (*opposite*), typifying the 'Transit Oriented Development' approach. (*Sources*: Bureau Stedenbaan and Municipality of Naples)

The Global Emergence of Transit Oriented Development and Its Challenge

Driving Forces Reconsidered

The integration of transport and urban development at railway stations is not only high on the agenda of European cities, but also elsewhere, be it under the banner of 'Transit Oriented Development' (TOD) as in North America and Australia (Cervero, 2004; Dittmar and Ohland, 2004; Dunphy *et al.*, 2005; Curtis *et al.*, 2009), or as yet without such a banner, as in the numerous railway station area development projects across Asia, and increasingly also South America (Cervero, 1998; Curtis *et al.*, 2009). The basic philosophy appears the same in all contexts: concentrating urban development around stations in order to support transit use, and developing transit systems to connect existing and planned concentrations of urban developments.

Many of the arguments for pursuing TOD are similar despite the different contexts (Cervero, 1998; 2004; Dittmar and Ohland, 2004; Dunphy *et al.*, 2005; Curtis *et al.*, 2009). As in previous phases there appear to be a mix of driving forces, the strongest drawn from the 'public policy and discourse' and 'demand trends' factors. Under the 'demand trends' factor, TOD would facilitate increased *accessibility* because it provides alternatives to automobile-based land uses. It attempts, at the very least, to create a land-use pattern that facilitates transportation choice, which is felt increasingly important, particularly given today's complex lifestyles and business practices. A second argument within this factor relates to the implications of transport and land-use patterns for the quality of urban life. The claim here is that TOD allows, at least potentially, a degree of human interaction in the public domain – or '*urbanity*' – that is difficult, if not impossible to achieve in much more socially segregated car-dependent urban environments. Within the 'public policy and discourse' factor,

even more compelling are arguments that stem from concerns about the *sustainability* of current urban mobility trends. Planners and policy-makers across the globe are advocating for transit and non-motorized transport based on resource efficiency.

Further discussion of these claims, or of their relationships with the six driving forces discussed above while interesting, is, however, not the focus of this part of the paper. Nor is the focus to articulate in detail what TOD as a planning or development concept entails. A healthy literature exists which examines benefits of TOD (see, for instance the overview on www.vtpi.org/tdm/), and there is certainly enough literature and examples to refer to as far as articulation of the concept is concerned (e.g. Calthorpe, 1993; Dittmar and Ohland, 2004). The aim here is, rather, to deal with a third set of issues: the actual *strategies* that are needed to establish TOD as a pattern of urban development, or to 'make TOD happen' (Curtis *et al.*, 2009). The discussion that follows takes us into the 'emulation' discussion, but aims to step beyond this to learning *how* TOD can be delivered taking into account local context. This is just as important, but much less debated, more poorly conceptualized, and comprises a more fragmented documentation of the issues. If the trend breaking impact that most TOD endeavours posit is to be achieved, this gap in knowledge needs to be filled. Otherwise, the risk that the apparently simple, but rarely fruitful, 'emulate the best practice' approach characterizing much of the past efforts at station area redevelopment is again followed and will be difficult to avoid.

When attempting to achieve changes in transport and urban development patterns in practice these are often met with resistance; barriers are put in the way. There is an increasing interest in such barriers to change, not least because unless we understand them we will not find a way forward (May and Marsden, 2010). Marvin and Guy (1999) argue that attention must not just be given to

concepts (such as, for example, TOD), but also attention must be 'paid to social, economic and technical processes involved in shaping the feasibility of the concept' (p. 10). Both Banister (2005) and Van Vliet (2000) remind us that there are many complexities and potentially conflicting interests which limit our ability to turn knowledge into action in the transport and urban development domain. Rietveld and Stough (2005) note that it is the institutional barriers that are a major impediment to action.

A large institutional barrier is, for instance, restrictive zoning policies that prevent mixed use and dense developments, despite a market that would support such development (Levine, 2005). Building on this concept, Leinberger (2009) notes that such barriers have limited the supply of 'walkable urbanism' (i.e. TOD) in favour of 'drivable urbanism'. This is especially true in auto-dependent countries, such as the United States. In fact, less than 5 per cent of urban development in the United States can be considered walkable and/or TOD, despite market studies that indicate that 30–50 per cent of America would choose a TOD, if such a product existed in the marketplace. A recent study supports this and found that nearly 80 per cent of those in Generation Y (born 1983–2001) desire to live in an urban core because they prefer mixed use and well connected neighbourhoods. Studies have also found that Baby Boomers share the same desires as Generation Y, to live in walkable and transit-served communities as they retire (Broberg, 2010).

Other institutional barriers include the limited role of regional public transit agencies to develop their property around railway stations. This is because some transit agencies view their role solely as providing transportation, not as a real estate developer. This is an interesting contrast when considered in the context of the strategies of privatized national railway companies discussed in Frame 1: Property capitalization. As a result, many railway station areas have become focused on commuter parking, which are difficult to redevelop into TODs because of resistance from commuters. Moreover, such locations are typically located in automobile-dependent suburbs whose populations have resisted the dense development associated with TOD. This is a conundrum given that transit agencies are now directing efforts to these locales in order to provide transit as an alternative to the car. Such barriers have led to many transit agencies ignoring land use as a mechanism to generate more sustainable transport outcomes.

Thus, in order to 'make TOD happen' these barriers must be overcome. This paper starts to unravel these complexities by looking at the way in which cities around the world have found a way forward. In order to set the scene, below the transport and land use development challenge of TOD is briefly summarized, and from there we move on to introduce in more detail the governance challenge central to this section of the paper.

A Transport and Land-Use Development Challenge

Basic characteristics of the transport and land-use systems determine the competitive position of transit relative to the car, and thus set the backdrop to the spatial challenge of TOD. There are two basic correlations (figure 5; Bertolini and Le Clercq, 2003). The first is between the speed of a transportation system and the scale at which an urban system works, for instance, expressed in terms of distances between places of residence and places of work. The second basic correlation is that between the capacity and flexibility of a transportation system and the degree of spatial concentration of activities, as for instance, identified by residential and employment densities. The car – a low capacity, high flexibility, and high-speed transportation means – is best fit to high spatial reach and low-density urban environments. Transit matches the speed of the car, has higher capacity, but lower
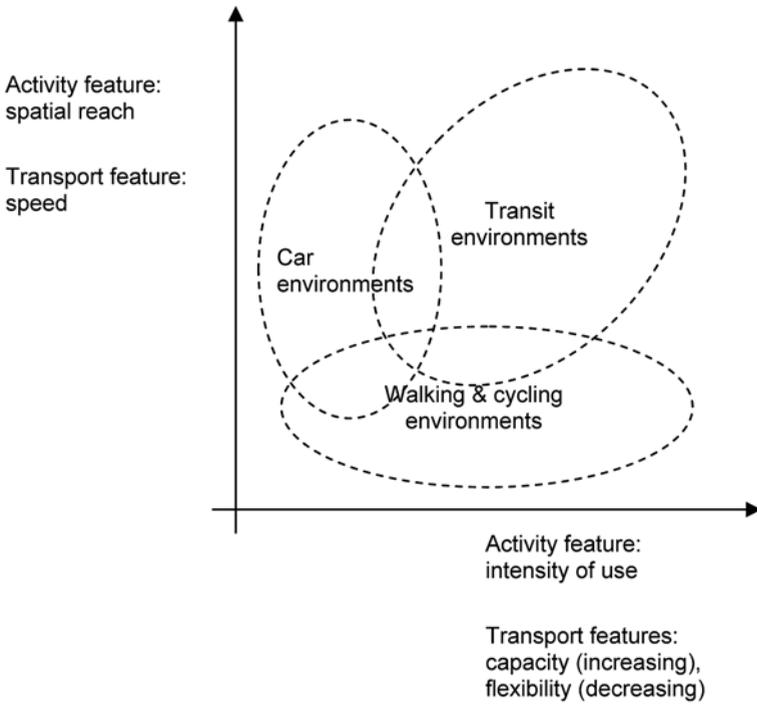
Figure 5. Basic transport and land use correlations. TOD pursues a combination of transit and walking and cycling environments. (*Source*: Bertolini and Le Clercq, 2003)
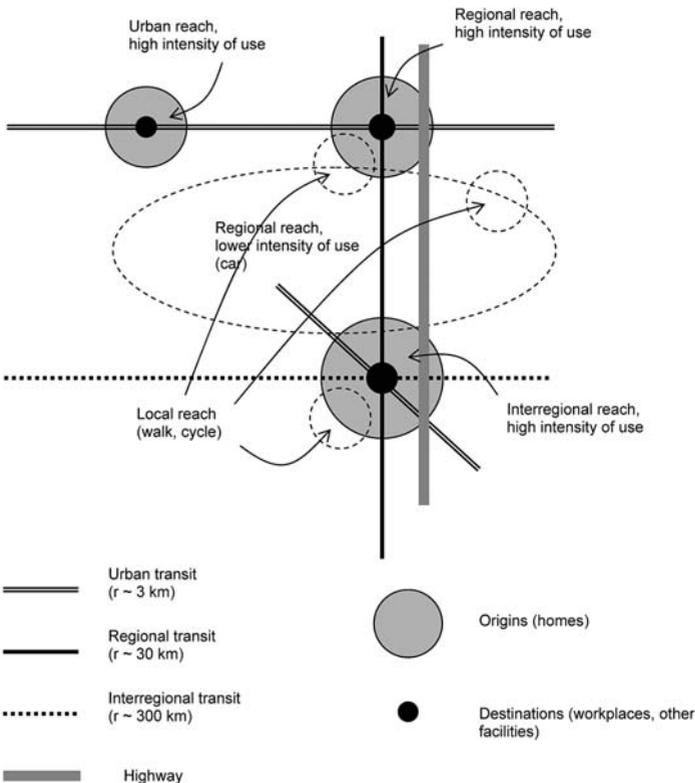

Figure 6. Schematic representation of an integrated strategy exploiting the synergy between transport and land-use features. (*Source*: Bertolini and Le Clercq, 2003)

flexibility. Non-motorized modes have both high capacity and high flexibility but miss speed and spatial reach. In order to provide a competitive alternative to the car (i.e. *both* fast *and* flexible transport) the strengths of transit and non-motorized modes need to be combined. This is one central idea of TOD. However, this transport combination can only be successful in the presence of short distance and/or high-density spatial patterns. Promoting these is a second central idea of TOD.

This brief conceptualization points at the fundamental aspects of the transport and land-use challenge of TOD. In terms of land-use change it is above all a matter of increasing densities and functional mix, and especially around transit nodes. In terms of transport change it is a matter of improving the competitiveness of alternatives to the car, by increasing their flexibility (most notably of transit) and their effective, door-to-door speed (especially of non-motorized modes). This need not be so much the case in absolute terms, but relative to the car, implying that also policies aimed at either reducing the flexibility of the car (such as carpool-only lanes or parking restrictions) or its speed (such as speed limits) are favourable. A more general, and crucial, conclusion is that coordination between transport and land-use choices and conditions is essential for TOD to be successful. Figure 6 schematically visualizes the spatial implications of this conclusion.

A Governance Challenge

For all its potentials, the integration of transport and urban development at station areas advocated by TOD is a very complex challenge. Station areas are both *nodes* and *places* (Bertolini and Spit, 1998): nodes of networks, and places in the city. Station areas are (or may become) important 'nodes' in both transport and non-transport (e.g. lifestyle, business, consumption) networks. On the other hand, station areas also identify a 'place', a both permanently and temporarily inhabited area of the city, a dense and diverse conglomeration of uses and forms accumulated through time, which may or may not share in the life of the node. Accordingly, a multifarious array of both node- and place-based actors crowd station precinct redevelopment processes. The local government and transportation agency are two recurring examples. Depending on the local context, other actors may have a decisive role. These include different levels of the public administration, different transportation providers and, most importantly, market actors: developers, investors, and end-users. Furthermore, and particularly at station locations set in existing areas, local residents and businesses will also have a significant stake. The objectives of this heterogeneous array of actors are often conflicting and at best uncoordinated. Even when there is enough agreement on the goals, existing organizational structures, regulations, professional practices, or public attitudes, may prove insurmountable barriers. Ways of overcoming these are the object of the next section.

Towards Success – Emulating TOD Strategies by Taking into Account 'Context'

Strategic Components

The above has made clear that TOD is a uniquely complex undertaking: two worlds, that of transport development and that of urban development have to be brought together; developments at different scales (the station area location, and the urban regional railway network) need to be coordinated. A shift towards TOD requires that reciprocally reinforcing processes – intensifying/diversifying urban centres and (re)connecting urban centres through transit – are activated and maintained. This seems clear, but how to do it? Which strategic components are required to 'make TOD happen'? These questions

were central to a recent recognition of TOD experiences around the world (Curtis *et al.*, 2009). The main debates and findings can be usefully summarized below.

Based on experiences in Australia, Newman (2009) concludes that the following strategic components are needed for 'TOD to happen':

◆ a strategic planning framework that (1) asserts where centres need to occur, in what density and mix, and (2) links these centres with a rapid transit base, almost inevitably with electric rail;

◆ a statutory planning base that requires development to occur at the necessary density and design in each centre, preferably with a specialized development agency;

◆ a public-private funding mechanism that enables the transit and the TOD to be built or refurbished through a linkage between the transit and the centres it will service.

Comparative analysis of the TOD practices in North and South America, Australia, Asia, and Europe reviewed in Curtis *et al.* (2009) partly confirms and partly nuances these general statements. First, there does not seem to be a strong relationship between the existence of *all* strategic components listed above and TOD implementation. Rather, strong internal consistency between at least some key components would appear necessary, so that sufficient incentives for pursuing integration between transport and urban development are in place. Illustrative in this respect is a comparison between the TOD implementation strategies of Singapore (Pei-ju Yang and How Lee, 2009) and Tokyo (Chorus, 2009). Both are successful in TOD terms: in both strong, urban region-wide linkages can be observed between the development of public transportation networks and the development of centres around the nodes of those networks. However, while Singapore seems to come

close to the government planning ideal sketched by Newman, Tokyo appears to have achieved much of the same through a reliance on market forces and public incentives rather than government planning. The most important, common factor seems to be the existence of transit-urban development linkage mechanisms, not so much the particular form of governance (government or market led). In Singapore these mechanisms rely on planning coordination measures such as those cited by Newman and advocated by many others. In Tokyo, they are rather the product of market forces (most importantly embodied by the business strategies of private railways) in an environment with strong public incentives towards TOD (most importantly including a transport policy where car ownership and use have been constrained and public transport actively promoted and a land-use policy where regulations favour developments around stations).

Second, there seem to be quite different local interpretations of the ideal mix of strategic components, which rarely appear in the straightforward forms advocated by Newman. Crucially, more flexible inter-pretations can still work, as most notably shown in emerging European examples (as in Naples: see Cascetta and Pagliara, 2008; 2009; and in the Rotterdam-The Hague area: see Balz and Schrijnen, 2009) but also in emerging South American examples (as in Bogota: see Cervero, 2009). In all these cases, most of the strategic components advocated by Newman are in place, but they seem to be interpreted in more flexible ways (i.e. there are just 'elements of' a strategic planning framework, a statutory planning base, or a public-private funding mechanism, rather than full-fledged versions of them). An interesting question is whether this flexibility can only be allowed in transport and land-use contexts, such as those of European and South American cities, which are already relatively consistent with TOD in transport and land-use terms (e.g. much lower car share, much higher

population and job densities, see 'A Land-Use and Development Challenge' above), and whether in other, more car-oriented contexts more radical, less flexible interpretations are needed.

Third, in practice TOD strategies do not appear on one occasion, instead they show a definite pattern of development over time, marked by both stability and adaptation. The most accomplished approaches documented in Curtis *et al*. (2009) (including Singapore, Tokyo, Copenhagen, Stockholm, Curitiba, Portland, and Arlington County) all show a great stability of planning direction over very long time periods, typically spanning several decades. They also, however, document repeated adaptation of the strategy to respond to changing circumstances, or just to the changing understanding of the circumstances. Accounts of other accomplished TOD implementation strategies elsewhere (e.g. Cervero, 1998) confirm this pattern.

Transferring Lessons

The cases discussed in Curtis *et al*. (2009) and earlier in Cervero (1998) vary widely. So will the cases where the lessons of these experiences will be applied in the future. While differentiation could run along many lines, at least two basic distinctions appear important. The first is between situations where the dominant challenge is that of structuring 'new' urban growth versus situations of re-structuring 'old' growth. While the same city may present examples of both, on the whole the former situations are more typical of cities in their times of rapid expansion, as American, Australian, European and Japanese cities in the decades following World War II and cities in developing Asia, Africa or South America in present years. The latter situations are more typical of cities in their times of slower (or no) expansion as is presently the case in European or Japanese cities.

Focusing on the European context, Bertolini (2007) defines the challenge in the first group of structuring 'new' growth as one of 'Coordinated development' (typified by such 'classic' European TODs as Stockholm or Copenhagen) and in the second group of re-structuring 'old' growth as one of 'Reconnecting developments' (typified by 'emerging' European TODs such as the Stedenbaan and Naples – see figure 4). In the former category the focus is on coordinating new transport and land-use developments in a rapidly growing city, in the second it is rather on re-connecting largely existing transport and land use developments in a slowly transforming city (by incrementally integrating transport networks or by incrementally intensifying and diversifying land uses around transport nodes). Also the spatial and institutional contexts are different in the two groups of European TODs: from the relatively well defined 'urban government' of 'classic' examples to the more complex and elusive 'multi-level governance' (Salet and Thornley, 2007) of 'emergent' examples. European cities now attempting to establish TOD seem poised to gain much from the 'reconnecting developments' strategy illustrated by the 100 station plans and the regional metro in Naples, and by Stedenbaan in the Rotterdam-The Hague area in the Netherlands. In so doing, they may also learn to cope with an urban reality increasingly characterized by multiple, unstable hierarchies, and multi-directional flows, both in the spatial and institutional sense (Hall, 2009; Salet and Thornley, 2007).

A second important distinction stems from the basic relationships between transport and land use patterns discussed in the section 'The global emergence of Transit Oriented Development and its challenge' above. On one side there are cities and regions that, even without an explicit TOD (or comparable) strategy, already have transport and land-use characteristics relatively consistent with TOD (i.e. an extensive transit network and/or high land-use densities and functional mix, or a combination of 'transit' and 'biking and walking' environments: see figure 5),

and cities and regions that can be better characterized as 'car environments', referred to as the dichotomy of walkable versus drivable urbanism by Leinberger (2009). Most European cities fall in the former category. Defining examples of the latter are North American and Australian cities and regions, but there might be European cities and regions tending towards this categorization as well. TOD implementation strategies can be expected to be significantly different in the two situations. For instance, a more fully-fledged and far-reaching application of the strategic components identified by Newman might be needed in the second group. At the same time, public support could be much more difficult to get. This is so because here there is both a car reliant society as a result of urban planning and transport policy which has been framed around car mobility, and a car reliant culture within the community, and both frame the implementation approach and possibilities as well as the pathways by which it can and should evolve.

When looking for lessons to apply in different contexts it seems thus important to:

◆ Acknowledge the specificity of the local *context*, at least in terms of the dominant challenge (develop or transform?) and the existing transport and land-use patterns (more or less consistent with TOD?). Types of questions to prompt this exploration could be: what are and how consistent with TOD are current transport and land-use patterns? What are and how strong are present transport and land-use integration mechanisms? What is the scope for changing patterns and mechanisms? And thus, crucially: which cases elsewhere show most similarities and what could be the implications?

◆ Acknowledge the *uniqueness* of the task, and thus see approaches to the planning and development process that seem to work elsewhere more as a source of inspiration, as a possibility, rather that as something

to apply literally and directly. The starting point could be questions as: what are, in this particular situation, the opportunities and threats for the TOD implementation strategies adopted elsewhere? Which interpretations and adaptations of these strategies can strengthen transit and urban development integration mechanisms in this particular context?

More generally, the above means that the universal models on which some TOD literature tends to focus (e.g. Calthorpe, 1993; Roger, 1997; Hall and Ward, 1998) should not be embraced uncritically, and that the diversity of approaches central to other studies (e.g. Cervero, 1998; Curtis *et al.*, 2009) should be an indispensable complement. An important consideration when assessing the success of each of these approaches is the degree to which different goals and objectives have been achieved, especially within the context that different stakeholders view success differently. For example, transit agencies are most concerned with increasing ridership, local governments often focus on creating jobs and tax-base, whereas developers are most concerned with the return-on-investment (Renne, 2009). This varies with more academically oriented studies that measure the success of TOD implementation based on normative objectives, such as economic, environmental, and social impacts, including travel behaviour and built environment outcomes. While useful and important, a gap in research exists as to the extent in which TOD implementation succeeds or fails based on the aligning (or failure to align) of various interest groups in the planning and implementation process.

Conclusions

In this paper the main factors behind more than twenty years of station area projects in Europe have been identified. Both technological change (development

of high-speed and urban-regional railway networks, transfer of distribution and manufacturing activities away from station areas) and institutional change (privatization of railway companies) play a role, and are compounded by two different strands of public policies: promoting the attractiveness of urban neighbourhoods and cities and promoting sustainable development. The crucial importance of a sixth factor, demand rather than supply (the spatial dynamics of contemporary society) has also been underscored.

Next, three different ways of framing the challenge of station area redevelopment have been identified, each pointing to a different relevance of different driving forces: a 'property capitalization' frame dominating the discourse in the 1980s and typified by projects like Broadgate in London; an 'urban-mega project' frame more characteristic of the 1990s and typified by projects like Euralille in Lille; and a more recently emerging 'transit oriented development' frame as typified in Europe by such projects as the 100 station plan and the regional metro in Naples and Stedenbaan in the Rotterdam-The Hague area. As with all classifications, the risk of simplification is high. Different ways of framing do not just neatly begin and end one after the other. There are many overlaps, ambivalences, and contradictions. However, the classification might help see how both experiences and debates evolve, and what might become key issues in upcoming years.

Accordingly, and following the hypothesis that the upcoming challenge is best captured by the third frame, or the notion of Transit Oriented Development (TOD), the underlying rationale, the sort of challenge it poses, and emerging lessons from experiences and debates worldwide have been discussed. These both included strategic components and warnings about their uncritical application in different contexts. A central aim of this section – reaching further than the European context – was to provide insights that go beyond the call to emulate a perceived 'best practice' and was directed instead at using experiences elsewhere to understand better the opportunities and constraints for change in a given local situation or context.

What might be the implications of the argument for future research and policy? A first implication for research is that there is a need to broaden and deepen the knowledge base by bringing in more cases, and comparing them more systematically, so that the interplay of general and specific explanations in determining outcomes can be better understood. Perhaps even more importantly, it is necessary to focus, much more so now than has been the case, on understanding how and why *change* happens or does not. This takes knowledge beyond simply describing a successful model or experience. For instance, how and why has a particular city been able to innovate and achieve a transition towards Transit Oriented Development and how and why has another not been able to do so? What have been the drivers and mechanism of (no) change? What can others learn from this?

In terms of policy implications it seems clear that in choosing the most adequate approach much depends on the forces at play locally (the relative weight of the six driving factors, and the constraints and opportunities provided by the particular spatial and institutional context), but also on political choices (where is the focus, on promoting the economy or achieving sustainability?). Clear choices and awareness of forces working for or against desired changes seem crucial. But even when choices are clear, and forces may converge towards a desired outcome, much will remain uncertain; including which specific mix of strategic components will eventually prove effective and politically acceptable. It follows that an experimental attitude (and thus also the courage to take risks), and a willingness to learn (from both others' and own experiences) seems essential.

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